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ABSTRACT

The English-language literature since 1950 was searched to gather published reports of abstracting and indexing rates and costs, and cost figures for the complete preparation of secondary publication. The search located relevant information by 24 abstract journals and 3 citation services, 18 abstracting cost figures, and 41 indexing cost figures. These reported figures were extracted with text or other amplifying comment and tabulated, with reference made to the included 79-item bibliography. Unit costs per bibliographic item were cited or computed. These data were plotted to detect possible patterns or trends. The reported unit costs for preparation of the secondary services were adjusted for 1968 dollar value and were plotted by number of items cited annually. Abstracting costs and indexing costs were each plotted chronologically, and then in rank order with dollar value adjustments. Abstracting and indexing rates were plotted. The plots serve to illustrate the scattering of the data and emphasize the problem of drawing generalizations from the existing data. (Author)

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REVIEW SERIES NUMBER 5

ABSTRACTING AND INDEXING RATES AND COSTS:

A LITERATURE REVIEW

by

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Abstract

The English-language literature since 1950 was searched to gather published reports of abstracting and indexing rates and costs, and cost figures for the complete preparation of secondary publication. The search located relevant information for 24 abstract journals and 3 citation services, 18 abstracting cost figures, and 41 indexing cost figures. These reported figures were extracted with text or other amplifying comment and tabulated, with reference made to the included 79-item bibliography. Unit costs per bibliographic item were cited or computed. These data were plotted to detect possible patterns or trends. The reported unit costs for preparation of the secondary services were adjusted for 1968 dollar value and were plotted by number of items cited annually. Abstracting costs and indexing costs were each plotted chronologically, and then in rank order with dollar value adjustments. Abstracting and indexing rates were plotted. The plots serve to illustrate the scattering of the data and emphasize the problem of drawing generalizations from the existing data.

BACKGROUND

This report is meant to be a comprehensive compilation and review of the literature relating to the costs of abstracting and indexing -- both for the whole system of preparing and distributing an abstracting, reviewing, or indexing publication, and for the abstracting and indexing alone. This work builds and expands upon the review work done earlier by Landau,[40] Schutze,[62] and Stevens.[67] This report provides a complete bibliography of the relevant works that were identified, and also extracts and summarizes much of the data given in these reports.

The coverage for this report was restricted to the English-language literature from 1950 to the present. We emphasized the coverage of those publications that reported their actual experiences with abstracting and indexing operations. The data given in those publications was extracted and summarized in this report as given in or inferred from the original publications. The given data were plotted as a function of the year reported. In addition, the cost data for each year were normalized to the accepted 1968 consumer dollar, which was the one modification we felt could be made without additional information.* Aside from making this adjustment for the dollar inflation over the years, we made no attempt to normalize or in any other way modify the reported data, although such modifications might have been appropriate in order to do such things as standardize the treatment of general overhead costs.

Almost every one of the original reports was concerned with the processing of scientific or technical literature, in the usual forms of articles, patents, reports, and so on. In that regard, the reported data can be considered to be on a somewhat comparable basis.

Most of the cost reports were incomplete or faulty in some respect. This naturally limited the utilization and extension of the data provided.

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* Based on U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. 1970 World Almanac, p. 96.

These difficulties are discussed in more detail in later sections of this report.

Some of the data reported for a given service by several sources was contradictory. Examples of some of this can be seen in the tables of this review. In these cases of duplicate reporting, it is probable the included factors differ, and because we cannot standardize these factors, each report is taken as provided.

Some data was also obtained from personal communications in order to provide supporting information and a fuller context for the data from the literature. Letters were written to many of the abstracting and indexing services, requesting rate and cost data that could be used for this review; however, most of these services either ignored the request or said that the data was unavailable.

I GROSS COSTS TO PROVIDE SECONDARY SERVICES

The literature covered in this section relates to the total cost to provide a secondary publication service. This is defined to be a service that reviews source literature; prepares a bibliography, index, abstract, or review publication; and distributes that publication to a number of recipients. This definition includes the familiar secondary services such as Biological Abstracts and Index Medicus, as well as some lesser-known examples. This can include in-house publications as well as publications that receive more extensive distribution.

The reader of this section is cautioned to refrain from making too literal an interpretation and comparison of the data reported here. This data can provide only order of magnitude estimates of the costs of a secondary service, rather than absolutely precise figures. Further detailed study is necessary to develop cost data that would be more exact and directly comparable. The assumption of the present work is that any specific comparison is suspect, but that there is some validity in the total compilation.

The data in the original reports have been used in this summary to derive a gross cost per bibliographic item processed. In some cases, a gross unit cost was given in the literature; for other cases this was computed by taking the reported total annual cost of a given service, and dividing it by the total number of unique bibliographic items (articles, reports, books, patents, etc.) published by that service during that year. These computed gross unit costs are indicated in parentheses, and must be used with at least as much caution as cost figures provided directly by the services, because they lack verification. Each unit cost figure for a given year represented a single case history data point for this review. For several secondary services, it was possible to obtain such a cost figure for several different years. The data gathered in our search, as reported and as computed from the reports, is shown with text and references in Table I.

There are many differences in the methods used by various services to report their costs, making it hazardous to draw direct comparisons

of the figures reported for different services. Most of the difficulties stem from differences in what cost elements are included in the costs reported by the various services. The following factors contribute to the difficulty of comparing the services' unit costs, or of considering them to be the exact costs of production:

- Some services use volunteer or near-volunteer labor, others have to pay all the contributors
- Some services have to pay for the source materials, many do not because they use the library services of a cooperating institution
- Some services have research and development costs that may or may not be included in the reported expenses
- Some services may have special non-recurring costs (e.g., purchase of new equipment, file conversions, special development efforts)
- Some services have subsidies in the form of staff, office space, printing, mailing, R&D grants, or other services that are provided by another organization and may not be included in the reported costs
- Some services, particularly in recent years, have developed a mix of publication processes and information services that make it difficult to assign a cost to separate parts or services. A good example is the difficulty of assigning a gross unit cost to Chemical Abstracts, when the same large production facility also provides Chemical Titles, Chemical-Biological Activities, and other secondary publications; magnetic tape services; chemical compound searches; reference handbooks; and the compound registry system
- Services differ in printing (type of composition and printing, number of copies) and distribution (e.g., first class, book rate, government franked mail) expenses
- Some services report employee benefits and overhead costs, others do not
- There are variations in the type of abstracting provided (e.g., copy from other service, annotation, author abstract, new abstract, critical review)
- There are variations in type (KWIC, deep indexing with controlled vocabulary) and amount of indexing provided (indexes with each issue, quarterly, annual, 5-year cumulations; indexing by author and the usual access points, or special indexes such as chemical formula or notation indexes)

. There are differences in the data due to different dates of reporting (1950 vs. 1970 data) with the changing salary rates, techniques, as well as changing value of the dollar

The gross unit costs for more than 20 services, as extracted from the literature or obtained by the methods described earlier, are summarized in Fig. I-1 as a function of the annual production volume of items of each service, and adjusted to 1968 dollar values. The symbols used in this and other figures are identified in the tables associated with the figures. Reported costs for the bibliography or title listing services ranged from $2.18 to $2.24 per citation; when adjusted to equivalent 1968 dollar values, the unit costs ranged from $2.58 to $2.63 per citation.

Reported costs for abstracting services were generally higher, ranging from $1.59 to $57.96 per abstract. When adjusted to equivalent 1968 dollar values, the unit costs for abstracting services ranged from $2.30 to $57.96 per abstract.

There are too many differences in the data points (e.g., single points vs. several points for the same service, old data vs. current data, large volume production vs. small volume production, volunteer abstractors vs. paid abstractors) to make it particularly meaningful to talk of mathematical averages of all of this data. Further study is necessary in order to assemble these data points into major parametric or comparable groups, and perhaps make some adjustments to them before any meaningful "average" figure could be developed. At this point, the only valid generalization that can be made is that the gross unit cost to provide an abstracting service is likely to be in the range of $5-30 per abstract.

For those services for which more than one data point was available, no clear pattern emerged regarding the unit cost as a function of the calendar year or volume of coverage. For some services, the unit costs generally increased each year; but for some services it generally decreased each year. For some services, the unit costs increased as the service processed a larger number of items; but for some services the unit costs decreased with increasing volume of coverage. There was insufficient data to make a valid generalization on these points.

II RATES AND COSTS OF THE ABSTRACTING PROCESS

Those publications that reported the rates or costs of the abstracting process by itself, independent of the other costs of running an abstract service, received a separate analysis and review. These source reports also suffer from the same inexactness and incompleteness of reporting that was described in the previous section. Consequently, the reported rates and costs should be reviewed carefully before making direct comparisons.

The rates and costs reported for the abstracting process are given in Table II. Some of the reports included data on both indexing and abstracting, and for some of these it was not possible to separate the rates or costs of each process. For those instances in which the abstracting and indexing rates or costs could not be separately identified, the total cost was used and appropriately identified as a combination of both.

The abstracting costs in 19 reports ranged from $0.43 to $13.00 per abstract (excluding a special case of $250 per abstract); with most of the costs clustered between $2-8. This costs data is summarized in Fig. II-1 as a function of the year of the reported data. The normalized data are plotted in Fig. II-2. There is considerable variation in the reported data, and a mathematical average would not have much meaning for this mix of data (because of the combinations of reported ranges vs. single points, large samples vs. small samples, single vs. multiple points from the same facility, abstracting only vs. abstracting plus indexing). However, an estimated "average" or representative cost would seem to be about $5 per abstract.

Only five abstracting rates were found in reports: 4-8; 6-7; 8; 10; and 8-16 abstracts per man-day. These are illustrated in Fig. II-3. Based upon this data, a representative or "average" rate for the abstracting effort would seem to be about 8-9 abstracts per man-day.

III RATES AND COSTS OF THE INDEXING PROCESS

Reports of the rates or costs of the indexing process itself received a separate analysis and review. As with the abstracting reports, these also suffered from incompleteness and variances in reporting. Consequently the reported data should be reviewed with care before making direct comparisons. There were many more reports regarding indexing data than there were for the abstracting data. The rates and costs reported for the indexing process are summarized in Table III.

The indexing costs reported for more than 20 case studies ranged widely from $0.23 to $250 per indexed item, with most of the costs clustered between $1-20 per indexed article or report. This reported cost data is summarized in Fig. III-1 as a function of the year of the reported data. The same data, adjusted to the 1968 dollar values, are shown in Fig. III-2. Even disregarding the extreme points, there is still a very wide distribution of reported costs, with most of the data falling between $1-20 per indexed item. The differences would seem to be due largely to differences in basic factors such as type and depth of indexing, degree of vocabulary control, and type of source material indexed. Further study is needed in order to sort out this data into more meaningful groups according to some of these factors. It would be misleading to postulate any "average" indexing cost from the data assembled here.

The indexing rates reported for more than 20 case studies ranged widely from 2.4 to 160 indexed reports or articles per man-day. These rates are illustrated in Fig. III-3 as a function of the year of the reported data, and in Fig. III-4 in rank order. As with the indexing cost data, there is still a wide variation in the values of the reported indexing rate data, and probably for the same reasons described for the cost data. Most of the data falls in the range of 8-30 indexed reports or articles per man-day. As with the indexing cost data, further study is needed to group these case histories into major parametric groups, and any statement of "average" indexing rate would be misleading for this mix of data as reported here.

SUMMARY

The costs reported for abstracting and indexing services and processes were described in earlier sections, and are summarized below:

Gross Unit Costs to Provide Secondary Services (cost per abstract or citation)

	Number of Services Studied	Range as Reported ($)	Range as Adjusted to 1968 Dollar Value ($)	Representative 1968 Cost ($)
Citation Services	3	2.18-2.24	2.58-2.63	2.60
Abstract Journals	24	1.59-57.96	2.30-57.96	5.-30.00

Abstracting Process (cost per abstract)

Number of Services Studied	Range as Reported ($)	Range as Adjusted to 1968 Dollar Value ($)	Representative 1968 Cost ($)
14	0.43-250.00	.51-327.50	5.00

Indexing Process (cost per indexed report or article)

Number of Organizations Reporting	Range as Reported ($)	Range as Adjusted to 1968 Dollar Value ($)	Representative 1968 Cost ($)
26	0.23-250.00	.28-327.50 (1-20 for most points)	--

The rates reported for the indexing and abstracting processes are summarized below:

	Number of Reporting Organizations	Range of Rates	Representative Rates
Abstracting	5	4-16 abstracts/man-day	8-9 abstracts/man-day
Indexing	20	2.4-160 indexed reports or articles/man-day (8-30 for most points)	--

The published accounts generally provided inadequate description and supporting details to permit direct comparisons or extensions of this data. Any further generalizations regarding rates or costs of abstracting and indexing must wait until the data itself can be studied in detail, or until arrangements can be made to work directly with some abstracting or indexing operations to collect their data in a systematic and consistent manner.

The authors are interested in continuing this investigation, and expanding their findings with additional data. Hence we would welcome receiving any additional reports or data on this topic that you might care to send to us.

Publication	Year	Total Number of Abstracts or Citations Processed During That Year	Total Production Cost for That Year ($)	Average Cost per Abstract or Citation ($)	
				As Given	1968 Value
▽ Aluminum Technical Information Service	1969	5,000 est.	--	14.56	(14.00)
D Applied Mechanics Review	1964	7,600	131,000	17.20	(19.28)
✳ Bibliography of Agriculture	FY1962	90,215*	202,447*	2.24*	(2.58)
O Biological Abstracts	1955	20,058	--	7.00	(9.09)
	1956	30,080	305,000	(10.14)	(12.98)
	1964	107,000	929,000	8.70	(9.75)
	1966	180,000	1,500,000	(8.33)	(8.92)
	1967	215,000	2,150,000	10.02	(10.44)
	1968	220,000	2,200,000	10.04	(10.04)
▲ Bulletin of British Scientific Instrument Research Association	1950	2,461	3,360	(1.59)	(2.30)

* Services which do not provide abstracts with the citations.
( )Figures computed by the investigators, based on the reported data.

Tab

Representative Gross Costs t

Comments	Refs.
Monthly abstract journal with monthly index and annual cumulative index. Abstracts are bought from Amer. Soc. for Metals at fixed unit price.	27
	12
This cost includes salaries, fringe benefits, printing, equipment, supervision, and management.	48
"At present it costs us roughly seven dollars an abstract to produce Biological Abstracts ... about 50% of our abstracts are written by volunteer abstractors."	16,33
	56,75
	12
This included 2/3 abstracts and 1/3 title listings for all of their services.	56,75
	75
	75
Total cost to prepare an abstract bulletin and its indexes, 12 issues per year, 2,461 abstracts, was £1,400. "The Bulletin consists mainly of abstracts. These are prepared by the scientific assistants. Printing costs are about half the total costs so that the cost of making the abstracts, classifying, proof-reading, editing, and indexing is about 5s. 8d. per abstract (9s, including overhead)." It was assumed that the 1950 £ had a value of $2.80.	29

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Publication	Year	Total Number of Abstracts or Citations Processed During That Year	Total Production Cost for That Year ($)	Average Cost per Abstract or Citation ($) As Given	Average Cost per Abstract or Citation ($) 1968 Given
□ Chemical Abstracts	1960	132,159	2,650,000	(20.05)	(23.60)
	1960	132,500	2,650,000	(20.00)	(23.54)
	1963	170,000	4,550,000	(26.76)	(30.40)
	1963	167,256	4,550,000	(27.20)	(30.90)
	1964	188,000	4,904,850	26.00	(29.15)
	1964	187,911	4,904,850	(26.10)	(29.26)
◇ Computing Reviews	FY1967	(2,230)	99,274	(44.52)	(46.39)
	FY1968	(2,467)	142,975	(57.96)	(57.96)
✕ Current List of Medical Literature	1958	106,513*	232,385*	2.18*	(2.63)
△ Documentation Abstracts (now Information Science Abstracts)	1967	1,327	10,460	(7.88)	(8.21)
	1968	1,570	27,991	(17.83)	(17.83)
	1969	2,638	28,446	(10.78)	(10.14)

Tab

Representative Gross Costs

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Comments	Refs.
	59
"It cost $2,650,000 to produce CA in 1960, and $4,550,000 in 1963." The June article stated that there were 170,000 abstracts in 1963 CA.	13,14,63
	13,14
	59
	12
	59
This cost includes salaries, printing and mailing expenses, and the KWIC Index.	5
This cost includes salaries, printing and mailing expenses, and the KWIC Index.	6
Costs include personnel, equipment, supplies, printing, contract services, and distribution costs. Overhead, and the cost of printing semi-annual cumulations are excluded.	50
1966 was first year of full operation. Volunteer abstractors and indexers are used. Approximately half of the abstracts are lifted from other sources.	42,65
	42,65
	42,65

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Publication	Year	Total Number of Abstracts or Citations Processed During That Year	Total Production Cost for That Year ($)	Average Cost per Abstract or Citation ($) As Given	Average Cost per Abstract or Citation ($) 1968 Value
Δ Engineering Index	1957	26,797	163,413	6.09	(7.53)
	1958	27,945	184,208	6.59	(7.94)
	1959	29,770	219,240	7.36	(8.79)
	1960	33,071	256,566	7.75	(9.12)
	1961	36,614	283,131	7.73	(9.00)
	1962	38,120	344,885	9.04	(10.40)
	1963	41,703	336,110	8.05	(9.15)
	1964	43,622	479,552	10.99	(12.32)
	1965	45,001	781,867	17.37	(19.16)
	1966	51,412	904,639	17.59	(18.85)
	1967	51,670	1,064,248	20.59	(21.45)
	1968	51,724	1,124,924	21.74	(21.74)
	1969	52,899	1,014,462 est.	19.17	(18.04)
	1970	65,000 est.	1,032,072 est.	15.87 est.	
o Geoscience Abstracts	1964	6,000	81,000	13.50	(15.13)

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Representative Gross Costs

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Comments	References
For 1957-1961, items abstracted and indexed were processed for two EI information services: The Engineering Index Annual publication which includes an alphabetical arrangement of all abstracts produced by EI, cross referenced to related subjects, and a complete author index; and the EI Card Service available in some 249 divisions of engineering interest. For 1962-1964, items were processed for three services: the Annual, the EI Card Service; and (since October 1962) for the EI Monthly, designed on the same basis as the Annual. For 1965-1967, items were processed for: the Annual, EI Card Service, EI Monthly; and (starting in January 1965) for Plastics Monthly and Electrical and Electronics Section each of which provide: an author and a deep subject index produced for computer processing, and a cumulative annual author and subject index; also computer tape pilot programs (UPP-User Participation Program and CITE-Current Information Tapes for Engineers) for storage and retrieval of electrical/electronics, and plastics information. For 1968-1969, all items processed in 1967 except for the Electrical and Electronics Section, which was discontinued in December 1967. Plastics Monthly was discontinued December 1969. COMPENDEX (Computerized Engineering Index) began in 1969. "Plans for 1970 include the following projects: MONTHLY, ANNUAL, CARD-A-LERT (a revised and renamed Card Service), COMPENDEX, Microfilm (of the ANNUAL) and several subset contracts based on CARD-A-LERT and COMPENDEX. An anticipated budget of $1,032.072 (including a small r & d grant project) is anticipated to produce (all indexed but not all abstracted) a minimum of 65,000 items." For 1970, items are processed for Monthly, Annual, CARD-A-LERT, COMPENDEX, and microfilm edition of Annual.	79; related but contradictory data given in 10,12, 20,33,34, 49,51,63, 66

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to Provide Secondary Services

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Publication	Year	Total Number of Abstracts or Citations Processed During That Year	Total Production Cost for That Year ($)	Average Cost per Abstract or Citation ($)	
				As Given	1968 Value
✠ Index Medicus	1960	125,000*	273,925*	2.19*	(2.58)
	1969	230,000	--	>3.76	(3.53)

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Representative Gross Costs t

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Comments	References
Costs include labor, equipment, supplies, printing, rentals, contract services, distribution costs.	50
"In calendar year 1969, over 230,000 articles were indexed. Some of these were indexed commercially at a cost of about $2.50 per article. Many were indexed by our own staff, at a per-article cost that appears somewhat lower, but perhaps only because it is non-comparable since it does not include an allocation of overhead costs. Finally, much of our indexing is now received at "no" cost to the U.S. Government, because it is received as a quid-pro-quo from institutions having the privilege of searching duplicates of our tapes ... The indexed citations are converted into machine readable form, partly by National Library of Medicine staff, and partly by a commercial contractor who charges $1.26 per citation for keyboarding and proofreading. The citations that are input are used for Index Medicus, Cumulated Index Medicus, Abridged Index Medicus, 17 recurring bibliographies, published retrospective Literature Searches, as well as over 15,000 retrospective demand searches, and about 1,000 "S.D.I.'s." The indexing, keyboarding, and inputting costs far exceed the computer time costs, so the cost of Index Medicus depends primarily upon how one chooses to distribute these common costs among the products."	6a
The estimate of $3.76 was based on the sum of the highest unit cost for indexing, plus the machine input cost. No costs appear to be included for such things as maintenance of the subject heading list, overhead, computer processing, composition, printing, and distribution.	

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Publication	Year	Total Number of Abstracts or Citations Processed During That Year	Total Production Cost for That Year ($)	Average Cost per Abstract or Citation ($) As Given	Average Cost per Abstract or Citation ($) 1968 Value
◀ Kaiser Aluminum and Chemical Company	1966	2,000	--	7.68	(8.23)
⌂ Mathematical Reviews	1963	(13,297)	360,000	(27.07)	(30.75)
	1964	13,000	405,598	31.20	(34.98)
	1964	(12,570)	312,793	(24.88)	(27.89)
◇ Metals Abstracts and Metals Abstracts Index	1968	23,007	258,828	(11.25)	(11.25)
	1969	25,011	(250,000)	(10.00)	(9.94)
◆ Meteorological and Geo-astrophysical Abstracts	1964	9,000	300,000	33.30	(37.33)
✕ Psychological Abstracts	1964	10,500	100,000	9.50	(10.65)
■ Review of Metal Literature	1959	12,000	45,321	3.78	(4.51)
◢ Squibb Abstract Bulletin	1951	12,909	28,000	(2.17)	(2.91)

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Representative Gross Costs t

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Comments	Refs.
In-house abstract bulletin distributed in 200 copies. Cost includes labor and overhead, but no materials.	27
"... Mathematical Reviews incurs a deficit of nearly $200,000 a year out of a total budget of about $360,000." This report was given at a 1963 meeting, and assumed to represent the 1963 budget. The number of reviews published in calendar year 1963 was 13,297.	3
	12
A published account of the financial transactions of the society for the period 1 June 1963 to May 31, 1964, reported the expenses of Mathematical Reviews to be $312,793.11. The number of reviews published in calendar year 1964 was 12,570.	2
Exclusive of overhead, but including editorial and general expenses, production and distribution, and administrative and other expenses.	32
	32
	12
	12
One-third of the references are published as title listings only. Costs include preparation at Western Reserve University, editorial and administrative expenses at Amer. Soc. for Metals, and printing and distribution of 5,000 copies.	31,35
Weekly abstract bulletin distributed in approximately 350 copies. The cost figure, "... includes the labor costs for abstracting and editing as well as for typing, proofreading, multilithing, collating, distributing the bulletin, and the cost of materials. It does not include the labor cost for indexing of materials ... nor does it include other library costs such as subscriptions to journals and overhead. Finally, it excludes the cost of external distribution insofar as it could be spearated." About half of the entries were title listings.	64

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Publication	Year	Total Number of Abstracts or Citations Processed During That Year	Total Production Cost for That Year ($)	Average Cost per Abstract or Citation ($) As Given	Average Cost per Abstract or Citation ($) 1968 Value
○ Technical Abstract Bulletin and U.S. Government Research and Development Reports, and Indexes	FY1966	47,891	587,000	(12.26)	(13.13)
	FY1967	50,140	601,000	(11.99)	(12.49)
	FY1968	44,333	608,000	(13.71)	(13.71)
	FY1969	45,923	674,000	(14.68)	(13.80)
◒ USGRDR and USGRDR-Index	1968	37,106	246,000	22.00	(22.00)
	1969	35,788	191,000	--	--

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Representative Gross Costs

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Comments	Refs.
"Annual costs for publication of TAB and Indexes including Quarterly and Annual Indexes and the cost of announcing unclassified and unlimited documents in the USGRDR were: FY66 $587,000 (47,891 items announced) FY67 601,000 (50,140 items announced) FY68 608,000 (44,333 items announced) FY69 674,000 (45,923 items announced) Annually there are 24 issues of TAB, TAB Indexes, and USGRDR; three issues of Quarterly Indexes; and one Annual Index. Copy production averages 5,000 each."	1
"Our costs are usually based on the complete input cycle which includes examining the document for reproducibility and missing pages, checking for duplicates, descriptive cataloging, subject indexing, and abstracting. We would then keyboard the data for publication in the announcement journal. The cost per document involved in the above processing would amount to approximately $13.50 direct plus $8.50 for overhead. In most cases, abstracting costs would be included in the above costs as we are fortunate that over 90 percent of the reports we process have author abstracts. These are used in all cases and are only modified to meet certain criteria such as length and conversion symbols for acceptance by the computer. If it is necessary to write an abstract separately, the cost would be approximately $8.00 direct plus $5.00 overhead. This cost is based on writing an average of six to seven abstracts per day. The cost of preparation, production, and distribution of USGRDR and USGRDR-Index is as follows: (in thousands) 1969 1968 Preparation $ 82 $137 Production 85 85 Distribution 24 24 Total $191 $246 Titles announced 35,788 37,106	16a

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Publication	Year	Total Number of Abstracts or Citations Processed During That Year	Total Production Cost for That Year ($)	Average Cost per Abstract or Citation ($) As Given	Average Cost per Abstract or Citation ($) 1968 Value
Tobacco Abstracts	1967-68	2,148	40,148	(18.69)	(18.69)
	1968-69	3,182	45,082	(14.79)	(13.90)
(Unnamed)	1964	10,000	--	10.67	(11.96)
(Unnamed)	1964	1,000	--	11.33	(12.70)
(Unnamed)	1964	--	--	4.40	(4.93)
(Unnamed)	1961	--	--	10.00	(11.64)
(Unnamed)	1966	--	--	30.00[1]	(32.13)
				7.50[2]	(8.03)
(Unnamed)	1961	--	--	30.00[1]	(34.92)
				10.00[3]	(11.64)

[1] Abstract [2] Title only. [3] Index or citation entry.

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Representative Gross Costs

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Comments	References
Total costs for preparation, distribution, production.	44 44
Hypothetical abstract bulletin with 500 copies distributed weekly. This includes many factors such as subscriptions, abstracting, editing, supervising, indexing, typing, printing, mailing, and overhead. For this hypothetical bulletin, the author cites Ben Weil's lecture notes for Columbia and Rutgers.	25
Private communication to Friedenstein, describing costs of an abstract bulletin with 1,200 copies distributed quarterly. Cost factors such as abstracting, editing, supervising, indexing, typing, royalties, printing, mailing, and overhead are included.	25
Private communication to Friedenstein.	25
"A general average of $10 per document processed (either abstracted or indexed or both) seems to be a reasonable estimate of unit costs, at least for the major U.S. services. Some of the smaller, specialized services are known to have costs as high as $30 to $50 per document. Unit processing costs have doubled in the last 12 years. Eighteen U.S. services, with budgets totaling $7 million accounted for one-third of the two million documents processed in 1961 by 288 U.S. services in all scientific fields, making the average cost about $10 per document."	53
"The cost data suggest an average cost of $30 for an abstract including the bibliographic citation and an average cost of $7.50 for an item that is indexed but not abstracted. The average unit costs reported here are rough estimates. The data on which these estimates are based are extremely poor and do now allow comparisons between organization categories or between individual organizations."	71
This report and a subsequent book version, reference an NSF/OSIS informal document, and say, "NSF states that for 1961 the estimated cost per abstract is $30 and the estimate for an index or citation entry was $10."	12,70

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to Provide Secondary Services

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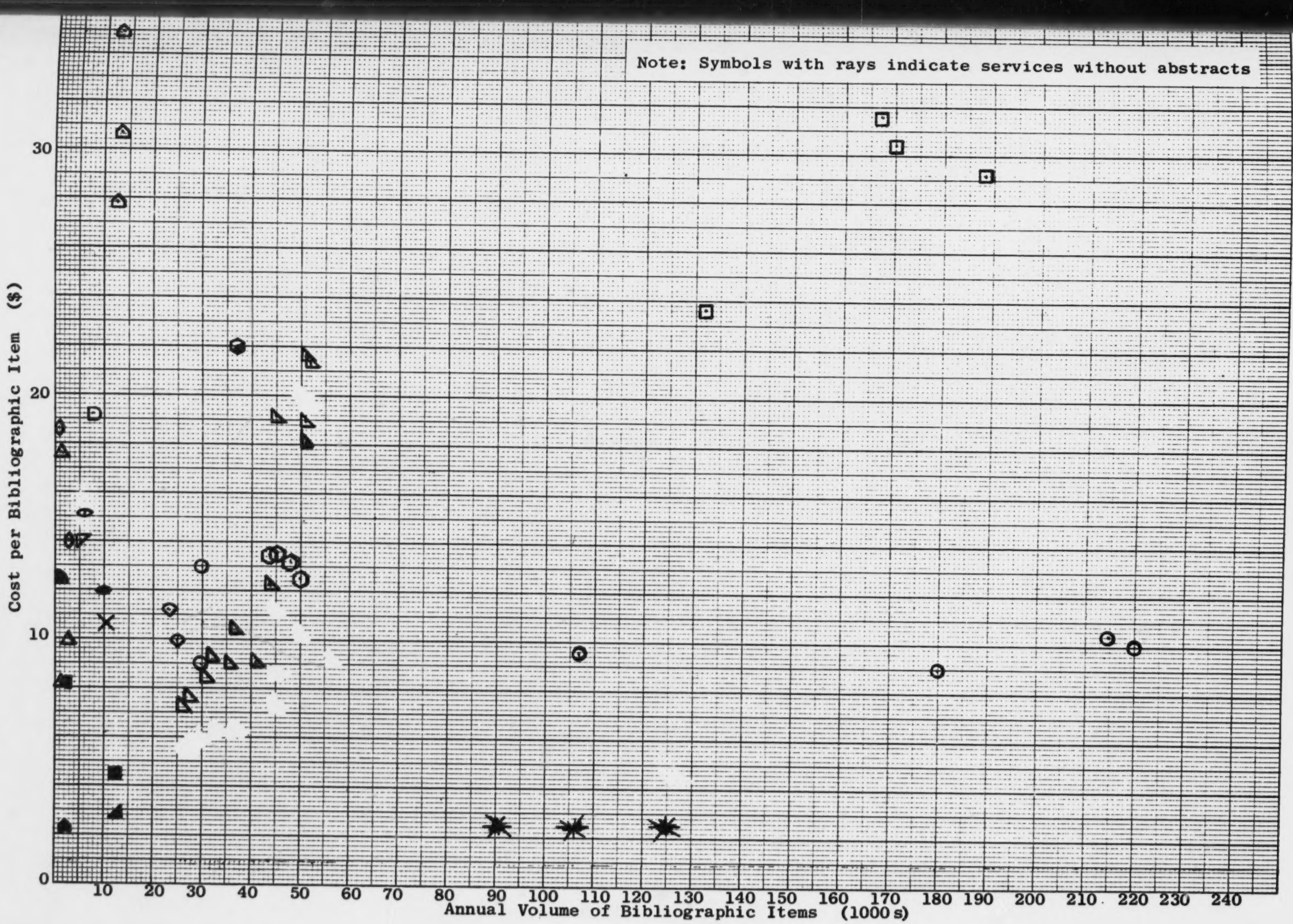
Note: Symbols with rays indicate services without abstracts
Cost per Bibliographic Item ($)
0
10
20
30
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240
Annual Volume of Bibliographic Items (1000s)

Fig. I-1

Gross Unit Costs to
Provide Secondary Services
(In 1968 Dollar Value, as a Function
of Annual Production Volume)

Organization	Date of Sample	Sample Size Used as Basis for This Report (number of abstracts)	Average Processing Rate** (abstracts/ man-day)	Average Cost per Abstract ($) As Given	Average Cost per Abstract ($) 1968 Value
○ American Oil Company	1960	15,000/yr.	4-8	5.80- 8.00	(6.83-) (9.42)
				6.20- 8.20	(7.30-) (9.65)
□ Arthur D. Little, Inc.	1952	1,000	--	250.00	(327.00)
◇ British Scientific Instrument Research Association	1950	2,461	--	1.26*	(1.82)
△ David Brown Industries, Ltd.	1960	640	--	(0.43)	(0.51)
◺ Eli Lilly and Company	1953	8,320	--	1.50	(1.95)

* Includes both abstracting and indexing efforts.
** Assume 2000 man-hours per man-year.
() Figures computed by the investigators, based on the reported data.

Comments	Ref.
"An English-language patent can be abstracted in an hour or two." "... for patents, raw abstracts cost between $2.00 and $5.00, and the effort costs about $3.80. The total cost, then, ranges from $5.80 to $8.80. Similarly for literature, raw abstracts cost between $1.00 and $3.00, and the effort is $6.20 to $8.20. Excluded in these figures are costs of journals, patents, paper, ink, machines, and equipment."	46
Total contract cost is divided by the total number of reports "extracted" on this project by A. D. Little to establish a punched card file on the literature of explosives for Picatinny. "The total number of reports extracted at present is about 900 and the final figure should not exceed 1000. Dividing this by the total cost gives a cost per report of approximately $250." Other estimates were computed on the basis of other factors. "Of these figures, the one based on the total project -- ... $250 per report extracted -- are the most reliable, and are the ones used as a basis of comparison and analysis below." (Ref. p. 30)	68
"... the cost of making the abstracts, classifying, proofreading, editing and indexing is about 5s. 8d. per abstract (9s. including overhead). A 1950 shilling was assumed to equal 14 cents.	29
"The cost quoted for an abstract (1s.5d.) is somewhat misleading in that the total costs cover preparation and typing of original abstracts and also the reproduction of published abstracts. A more exact figure for the original abstract would be, perhaps, 3s. 6d. for the preparation plus 1s. for typing, and for the copying of a published abstract 9d. for typing." A 1960 shilling had a value of 12 cents.	72
In-house abstract bulletin. "A recent cost survey which included time spent by abstractor, library staff, and departments responsible for mechanical processing resulted in an estimated $1.50 per abstract."	45

Table II

ported for the Abstracting Process

Organization	Date of Sample	Sample Size Used as Basis for This Report (number of abstracts)	Average Processing Rate** (abstracts/ man-day)	Average Cost per Abstract ($) As Given	Average Cost per Abstract ($) 1968 Value
Esso Research and Engineering Company	1960	--	--	4.00-7.00	(4.70-8.24)
ICI	1966	--	8-16*	2.80*	(3.00)
Kaiser Aluminum and Chemical	1966	2,000	--	7.68	(8.23)
Knolls Atomic Power Laboratory	1964	9,000	8*	4.00*	(4.48)
Plastics Technical Evaluation Center	1963-1964	1,920	--	8.20	(9.26)
	1963	1,000	--	(12.68*)	(14.04)

Tab

Rates and Costs Reported

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Comments	Ref.
"Similarly, a program at Esso Research and Engineering Company costs $4 to $7, exclusive of the expense of maintaining a reference pool of abstracts."	46
Indicative abstracts of new reports are prepared, and an average of 15-20 keywords are assigned to each report. "An eight to ten-line abstract is prepared. Author's summaries are taken into account, but not relied upon by the abstractors ... the average cost of indexing a report is approximately £1, of which about 15s. represents technical effort in reading, abstracting, and allocating keywords; this figure excludes overheads ... An indexing time of half an hour to an hour is usual ..." The 1966 £ had a value of $2.80.	28
Cost per abstract (including labor and overhead, but no materials) to prepare in-house abstract bulletin and distribute in 200 copies.	27
"The average cost to prepare the unit record for a document and place it on the system library tapes is about $4.00, which consists primarily of direct labor costs for professional and clerical efforts (less than 30 minutes each). Computer costs are virtually nil." (ref. p. 182) An average of 12 terms are assigned to each document. (ref. p. 178)	61
A 5 x 8 abstract card is prepared, but no mention is made of where the abstract comes from. "Indexing rate averages 2-7/8 document per hour." A cost breakdown for abstracting 1,920 documents showed a unit cost of $8.20, without specifying what was included in that figure. A total of $15.00 was given for all input processing and index production.	8
"Briefly, this index covers about 1,000 documents, each document being indexed under about 15 terms ... No master vocabulary was used, but an attempt was made to be consistent in assigning index terms. Terms were alphabetized, arranged, and printed by machine ... Abstracts are bound in separate volumes. The costs of abstracting and assigning coordinate terms ($12,680), machine indexing ($5,350), and reproduction ($2,300) worked out to $20.50 per document, which was believed to be exceptionally low." (ref. p. 192) "... our indexing rate averaged 2-7/8 documents per hour." (ref. p. 195).	4

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for the Abstracting Process

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Organization	Date of Sample	Sample Size Used as Basis for This Report (number of abstracts)	Average Processing Rate** (abstracts/ man-day)	Average Cost per Abstract ($) As Given	Average Cost per Abstract ($) 1968 Value
▽ U.S.Dept.of Commerce Clearinghouse for Federal Scientific and Technical Information	1968-1969	--	6-7	13.00	(13.00)
▲ Western Reserve University	1960	33,000	--	6.50*	(7.65)
	1961	36,000	--	6.49*	(7.55)
	1962	4,000	--	6.50-7.50*	(7.48-) (8.63)
○ Wyeth Laboratories	1964	2,500 est.	(10*)	(3.55*)	(3.80)

Tab

Rates and Costs Reported f

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Comments	Ref.
"If it is necessary to write an abstract separately, the cost would be approximately $8.00 direct plus $5.00 overhead. This cost is based on writing an average of six to seven abstracts per day."	16a
Total project input costs for a 13 month period were $239,345. The total per unit cost experienced to prepare both a conventional and telegraphic abstract was $6.50. This includes acquisitions, abstracting, editing and quality control, liaison activities, code making, automatic encoding, machine processing, supervision, equipment, supplies, subscriptions, 4% fringe benefits, and 15% overhead. The costs are reported in detail for all of the subprocesses.	55
Summary unit input cost is $6.492 for more than a year of additional experience since the last cost report. This includes acquisitions, analysis, editing, and quality control, liaison, code making, automatic encoding, supervision, computer processing, supplies, subscriptions, 5% fringe benefits, 20% overhead rate. The costs are reported in detail for all the subprocesses.	54
Estimates of costs of projected system, with input volumes of 5-20 thousand documents, including all personnel (except the systems manager), equipment, employee benefits, and overhead. This estimate was based on prior WRU operation of a pilot system with 4,000 documents.	57
"Writing and indexing abstracts required one man-year." On a salary basis this is $7,000, however benefits and other overhead charges can be estimated at another $1,000 ... Machine costs are $720 per year. Card costs ... are $57.60. Other paper supplies, filing cabinets, space rental amount to another $100."	19

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for the Abstracting Process

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Organization	Date of Sample	Sample Size Used as Basis for This Report (number of abstracts)	Average Processing Rate** (abstracts/ man-day)	Average Cost per Abstract ($) As Given	Average Cost per Abstract ($) 1968 Value	
○ (unspecified average for Germany)	1958	--	--	(2.33*)	(2.81)	"The following cost studies and compari Preparation of a bibliographic sou Preparation of th subject index Preparation of a abstract or whate selection Cost of classifyi or in another sys 4.3 DM equals one d
× (hypothetical abstract bulletin)	1964	--	--	2.88	(3.23)	Costs are postulate process is estimate supervision, typing
△ (unspecified)	1964	1,000	--	2.50*	(2.80)	Costs are based on stracts per year. editing, and superv

Table II

Rates and Costs Reported for the Abstracting

(continued)

	Comments	Ref.
:s, which were obtained through thorough and reliable .sons, may be considered average for Germany:		22
bibliographic card with title and ırces of a publication	1.00 DM ($0.23)	
ıe same bibliographic card with added	3.00 DM ($0.70)	
bibliographic card containing an ever facts are needed for mechanical	10.00 DM ($2.33)	
ng a title in decimal classification tem	1.0 DM ($0.23)	
ollar"		
d for a hypothetical abstract bulletin. The abstracting d to cost $2.88 per abstract, excluding subscriptions, , and overhead costs.		25
an actual abstract bulletin that publishes 1,000 ab- The $2.50 includes both abstracting and indexing, ision. This cost excludes typing and overhead costs.		25

Process

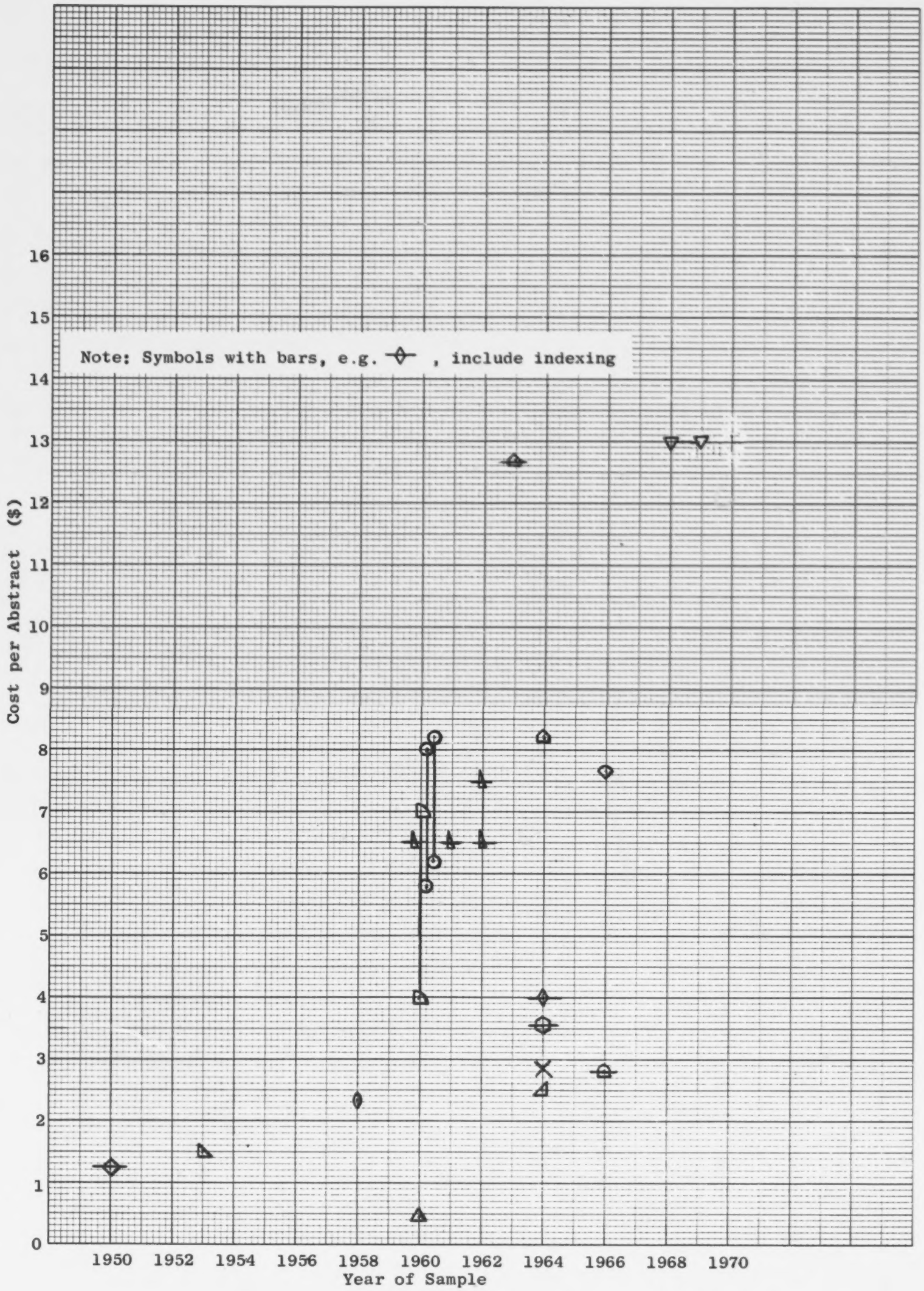

Fig. II-1

Costs of the Abstracting Process
(As Given, as a Function
of the Year)

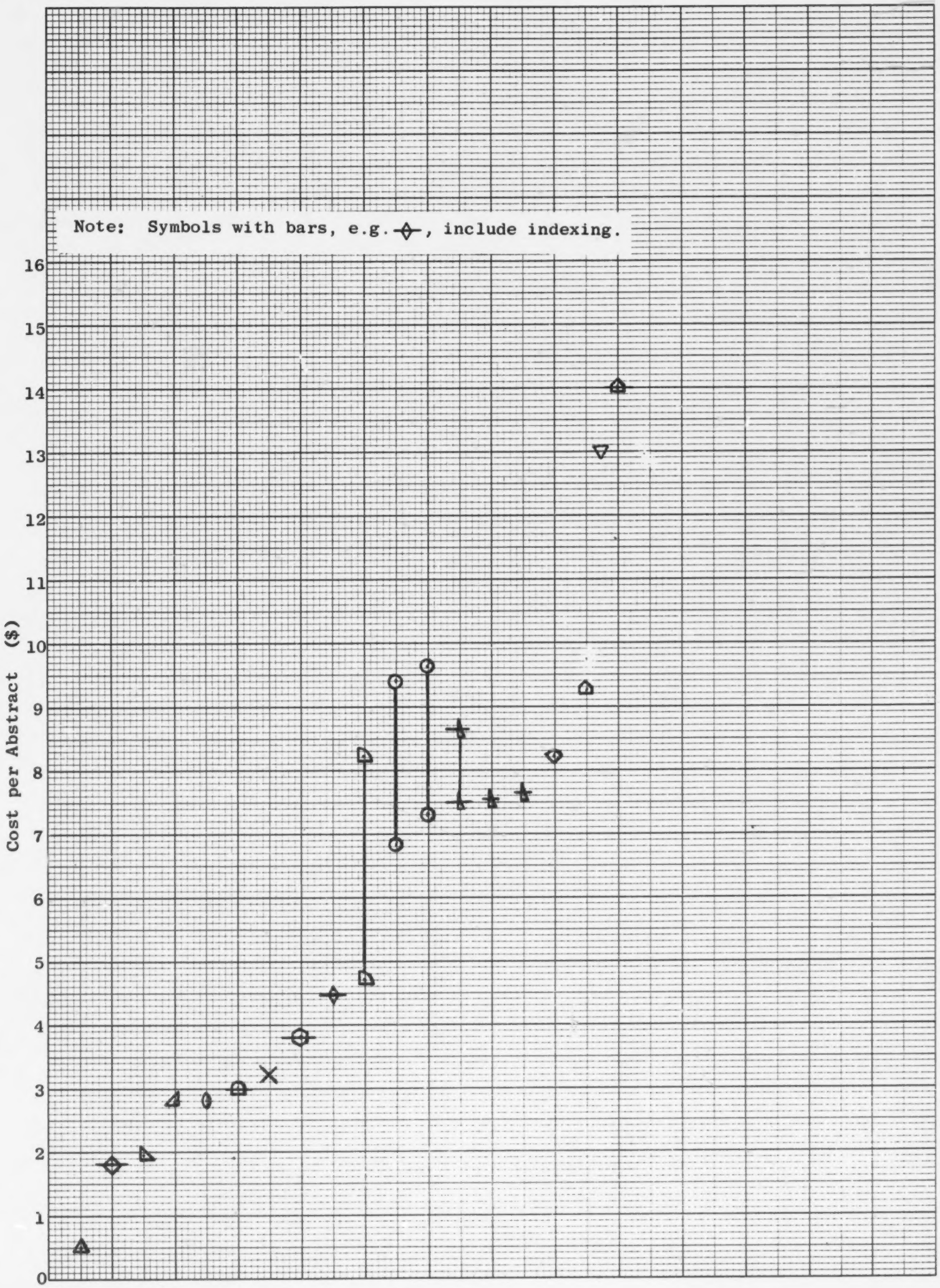

Fig. II-2

Costs of the Abstracting Process
(In Rank Order, Adjusted to
1968 Dollar Values)

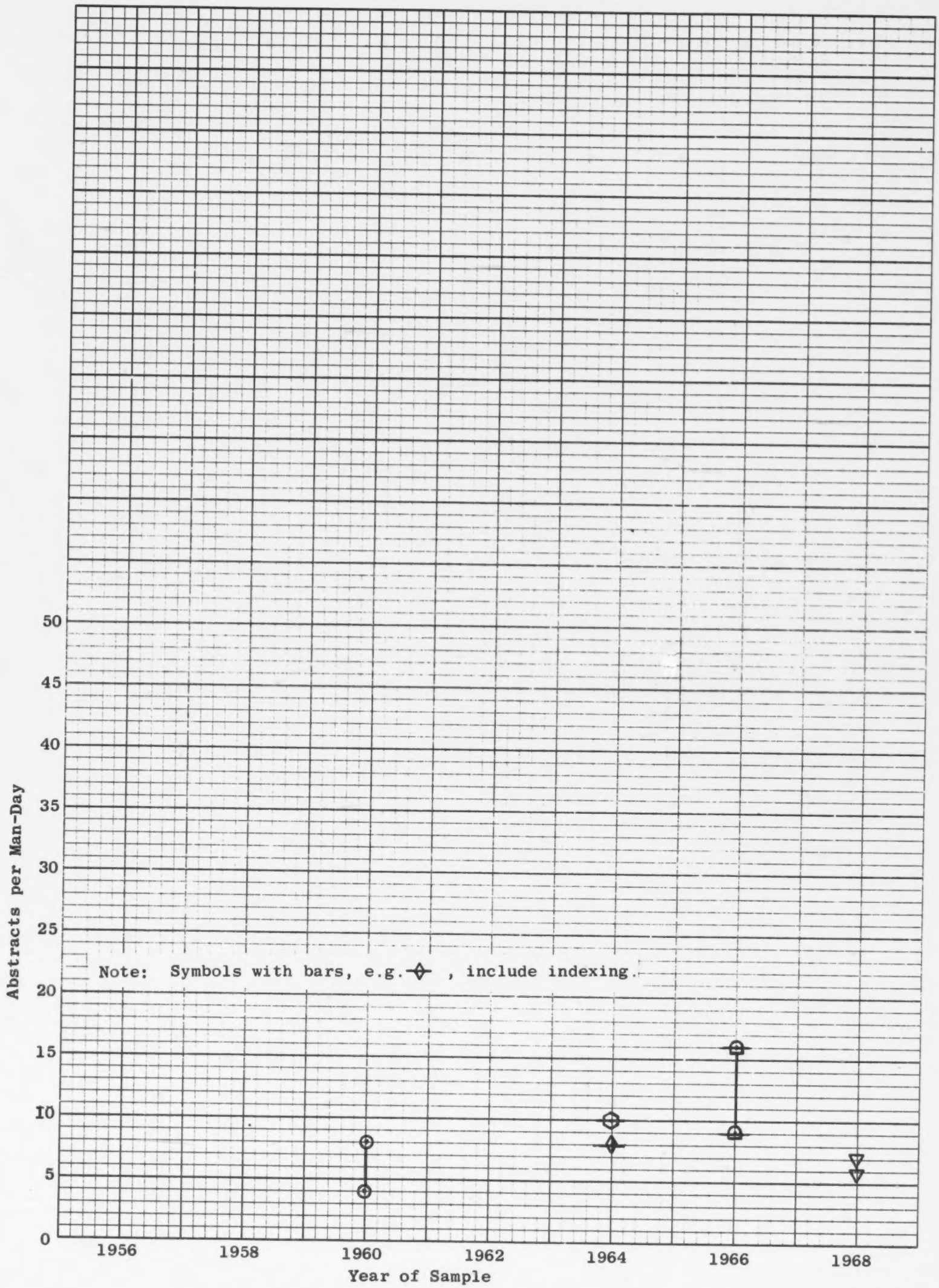

Fig. II-3

Abstracting Rates
(As a Function of the Year)

Organization	Date of Sample	Sample Size Used as Basis for This Report (number of reports or articles)	Average Processing Rate** (indexed articles or reports/ man-day)	Average Cost to Index Each Report or Article ($) As Given	Average Cost to Index Each Report or Article ($) 1968 Value
Aeronutronics	1961-1963	10,000	10.1	2.99*	(3.44)
American Institute of Chemical Engineers	1961	--	(12.0)	--	
American Meteorological Society	1958	7 bibliographies	--	0.51-2.33	(0.61 2.81)
Arthur D. Little, Inc.	1952	1,000	--	250.00*	(327.50)
Biological Abstracts	1955	30,000	--	6.38*	(8.28)

* Includes both indexing and abstracting effort.
** Assume 2,000 man-hours per man-year.

Comments	Ref.
Average 9.2 subject access points/document, processed for input to Termatrex equipment. Descriptors selected from Thesaurus of ASTIA Descriptors. Total costs, including labor and benefits, supplies, and equipment amortization was $29,922 for 10,000 documents. Average 47.43 man-minutes per report.	41
"For the AICHE Journal ... the work is done by graduate students who average about 40 minutes per article."	26
Costs experienced in the compilation of 7 special bibliographies, ranging in size from 100-224 citations, with differing degrees of editing, annotation, indexing, and distribution.	58
Total contract costs are divided by the total number of reports "extracted" on this project by A. D. Little to establish a punched card file on the literature of explosives for Picatinny. "The total number of reports extracted at present is about 900 and the final figure should not exceed 1,000. Dividing this by the total cost gives a cost per report of approximately $250." Other estimates were computed on the basis of other factors. "Of these figures, the one based on the total project -- ... $250 per report extracted -- are the most reliable, and are the ones used as a basis of comparison and analysis below." (ref. p. 30)	68
"Today, and for the remainder of 1956, ... we are reasonably sure that each abstract published will cost $1.33 for editing 1.40 for composition and proofreading 2.20 for printing and binding .82 for index editing .28 for index composition and proofreading .35 for index printing and binding." "... about 50% of our abstracts are written by volunteer abstractors."	16

Table III

orted for the Indexing Process

Organization	Date of Sample	Sample Size Used as Basis for This Report (number of reports or articles)	Average Processing Rate** (indexed articles or reports/ man-day)	Average Cost to Index Each Report or Article ($) As Given	Average Cost to Index Each Report or Article ($) 1968 Value
British Scientific Instrument Research Association	1950	2,461	--	(1.26)*	(1.82)
Bureau of Ships	1963-1964	218	(15.6) for indexing	--	
Chemical Abstracts Service	1964	93,000	--	(7.11) est	(7.97)
Chemical-Biological Coordination Center	1953-1956	--	--	29.46	(38.50)
	1955			50.00	(64.90)
Cranfield	1959	--	(24.0)	--	

Tab

Rates and Costs Reporte

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Comments	Ref.
"... the cost of making the abstracts, classifying, proofreading, editing, and indexing, is about 5s. 8d. per abstract (9s. including overhead)." A 1950 shilling was assumed to equal 14 cents.	29
Coordinate indexing with links and roles. "During the last indexing period, 218 reports were indexed in 112 man-hours, for an average of 1.95 documents per man-hour." (BuShips ref. p. 3). After subject indexing, it was necessary to convert the descriptors to computer codes. "The coding rate, not including supervision or checking, averaged 4.32 documents per man-hour." (BuShips ref. p. 6). "The coding rate of 4.32 documents per hour could be improved, even with the same general procedures, if better code books were available." (BuShips ref. p. 20).	30, 39, 74
This data was only for the production of a single subject and formula index to Chemical Abstracts, and does not include any of the acquisition or abstracting costs. This article reports the time required by all labor types in the production of the indexes for Vol. 60 (Jan.-June 1964). Assumptions were made for this summary regarding salaries associated with these reported man-hours, and a total unit cost estimated to be $7.11 per abstract, just to produce the indexes.	77
"Accurate cost studies were never conducted. One estimate placed the cost per article processed at $29.46. ... A second estimate based on the number of code sheets completely processed and released for filing during fiscal year 1955 placed input costs at ... $50.00 per article."	18
"It appears from personal discussions that an average of 20 minutes for a general collection of technical reports is the top limit, and this has been taken to be the maximum indexing time to be used in the project."	15

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Comments	Ref.
"Unit costs per title, based upon DDC's engineered standards for the following performance elements are: Analyze and abstract $5.38 Review analysis and abstract .99 Catalog documents 6.33 Review titles cataloged 1.01 Edit and review 3.91 Our document contributors prepare and submit to us an abstract with their report. Costs which DDC categorizes as "Analyze and Abstract" include analyzing, indexing, categorizing, coding, revising, and/or annotating data."	1
For this review, it was assumed that the sum of the first two costs would represent the full cost of the indexing process. The full cost of production of this service is about twice this cost.	
"That was our pilot run... It contained 250 reports and required 5 man-months of indexing time for a graduate chemical engineer and a Ph.D. chemical engineer at a cost of $9,000."	21
"This broadened information system involving 2,100 reports was begun in January 1959, and finished in June 1960. It involved 12[illegible] indexers who spent a total of 25 man-months and we estimate the total cost at $62,000."	21
Indexing of about 5,000 plastics patents. "The job was begun in June 1960 and finished in March 1962. It cost $107,000. All this indexing was done by 3 girls, who were chemists."	21

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Organization	Date of Sample	Sample Size Used as Basis for This Report (number of reports or articles)	Average Processing Rate** (indexed articles or reports/ man-day)	Average Cost to Index Each Report or Article ($)	
				As Given	1968 Value
⬡ Defense Documentation Center	1969	50,000	--	6.37	(5.99)
◇ DuPont	1958	250	(2.4)	(36.00)	(43.38)
	1959-60	2,100	(4.0)	(29.52)	(34.75)
	1960-62	5,000	--	(21.40)	(24.91)

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Rates and Costs Reporte

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Organization	Date of Sample	Sample Size Used as Basis for This Report (number of reports or articles)	Average Processing Rate** (indexed articles or reports/ man-day)	Average Cost to Index Each Report or Article ($) As Given	Average Cost to Index Each Report or Article ($) 1968 Value
◇ E. I. du Pont de Nemours & Co.					
System A	1964	5,000	(5.8)	(15.10)	(16.93)
System B	1964	811	(8.0)	--	
System C	1964	5,000	--	(4.00)	(4.48)
◆ ERIC Clearinghouse on Early Childhood Education	1967-68	1,500	--	12.00-15.00	(12.00-15.00)
Geoscience Abstracts	1964	6,326	(80-160)	(0.63)	(0.71)

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Rates and Costs Report

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Comments	Ref.
"Both systems used concept coordination, with System A indexing the names of chemical processes, properties and equipment to an average depth of 90 terms per document ... System B indexed the names of chemicals to an average depth of 70 terms per patent ... System A used links and a set of 11 roles, whereas System B used no links and 5 roles. System A employed vocabulary control by using Chemical Abstracts' system of nomenclature, provision for treatment of nonchemical terms for synonyms and near synonyms and generic posting of both chemical and nonchemical terms. System B, ... used no vocabulary control."	47
"Input costs for System A include a little over one hour of technical time per patent for indexing and vocabulary editing, about half an hour of clerical time and 3 dollars per patent for keypunching, tabulating, and computer updating costs. System C input costs are considerably lower, including about 5 minutes of abstracting and indexing time plus a half hour of clerical time. No machine costs are involved for C."	
"Processing of documents costs between $12-15 per document."	11
"With experience, one person can index from 10 to 20 documents per hour. ... This is approximately the same effort given to assigning traditional index entries." (ref. p. 14). Not including the cost of final printing or of assigning UDC numbers (which is considered a part of abstracting operations) the first full subject index to Geoscience Abstracts, including supplies, keypunching, programming, computer time, proofreading and editing, cost about $4,000. Succeeding years' costs averaged considerably less." (ref. p. 15).	60

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Organization	Date of Sample	Sample Size Used as Basis for This Report (number of reports or articles)	Average Processing Rate** (indexed articles or reports/ man-day)	Average Cost to Index Each Report or Article ($) As Given	Average Cost to Index Each Report or Article ($) 1968 Value
▽ IBM British Laboratories	1962	2,000	--	(0.70) (manual UDC)	(0.81)
				(0.28-0.49) KWIC indexing	(0.32-0.56)
⋈ ICI	1966	--	8-16*	2.80*	(3.00)
✳ Knolls Atomic Power Laboratory	1964	9,000	8 est.*	4.00*	(4.48)
● Linde Co.	1959	2,333	--	63.50	(75.82)
▲ Monsanto Chemical Co.	1962	8,500	(47.2)	0.39	(0.49)

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Rates and Costs Reported

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Comments	Ref.
For indexing 2,000 documents, the following costs are given: Conventional UDC indexing £500 KWIC indexing on an in-house computer £200 KWIC indexing on a data center computer £350 No supporting evidence is given for these costs. The 1962 £ had a value of $2.80.	7
Indicative abstracts of new reports are prepared, and an average of 15-20 keywords are assigned to each report. "An eight to ten-line abstract is prepared ... Author's summaries are taken into account, but not relied upon by the abstractors ... the average cost of indexing a report is approximately £1, of which about 15s. represents technical effort in reading, abstracting, and allocating keywords; this figure excludes overheads ... An indexing time of half an hour to one hour is used ... The 1966 £ had a value of $2.80.	28
"The average cost to prepare the unit record for a document and place it on the system library tapes is about $4.00, which consists primarily of direct labor costs for professional and clerical efforts (less than 30 minutes each). Computer costs are virtually nil." (ref. p. 182). An average of 12 terms are assigned to each document. (ref. p. 178).	61
Costs include labor and machine rental.	78
"Three college juniors who both completed 3 or more years of chemistry ... were assigned the task of indexing ... they actually indexed 8,500 reports ... during the summer at a direct cost of $3,328, or $0.39 per report. Indexing was carried to an average depth of 12.2 locators per report ... the actual time required for the indexing was 1440 hours. The average indexing rate was 5.9 reports per hour ..." (The quoted labor cost is equivalent to $2.31 per hour.) All of this indexing was done from the report announcement and abstract.	43

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for the Indexing Process

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Organization	Date of Sample	Sample Size Used as Basis for This Report (number of reports or articles)	Average Processing Rate** (indexed articles or reports/ man-day)	Average Cost to Index Each Report or Article ($) As Given	Average Cost to Index Each Report or Article ($) 1968 Value
▲ Monsanto Chemical Co. (continued)	1962	--	(16.0)	2.25	(2.59)
◊ Nationaal lluchtvaart laboratorium (Holland)	1959	--	(5.3)	--	
▬ NLM	1960	125,000	(37.0)	(0.67)	(0.79)
	1968	--	40-50	--	
	1969	230,000		2.50	(2.35)
▽ Patent Office	1962	60,000	--	12.00	(13.80)
	1963	201	(2.5-7.5)	--	

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Rates and Costs Reporte

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Comments	Ref.
"Indexing in depth directly from the reports is slower than indexing from the report announcement, requiring from 30-40 minutes per report and averaging 23.2 term-roles per report. The average time has been two reports per hour ... Since higher paid technical employees are required, the costs average $2.25 per report indexed ..."	43
"Few reliable figures have been given for current practices, although a particularly high figure is the 1½ hour average quoted for indexing reports for the catalogue of aerodynamic data prepared by the Nationaal lluchtvaart laboratorium in Holland."	15
For the 1960 Index Medicus the unit costs for indexing and indexing assisting totaled $0.67 per article, based on a volume of 125,000 articles per year. This cost included labor, equipment supplies, rentals, and contract services. This was done with 13.5 personnel positions. For the 125,000 articles, this leads to an estimate of 37.0 items per man-day.	50
"... an experienced indexer at NLM will index 40 to 50 articles per day."	38
"In calendar year 1969, over 230,000 articles were indexed. Some of these were indexed commercially at a cost of about $2.50 per article. Many were indexed by our own staff, at a per-article cost that appears somewhat lower, but perhaps only because it is non-comparable since it does not include an allocation of overhead costs."	6a
"Approximately 60,000 patents are reclassified annually at a total cost of approximately $12.00 per patent."	76
The 1963 report gives the following average patent indexing times (man-minutes) for several modes of operation:	9, 36, 37

single analyst	64.6
double analyst	128.6
triple analyst	193.2
single analyst/reviewed	111.6
double analyst/reviewed	183.5

This is the combined data for both experienced and inexperienced analysts. The 64.6, 128.6, and 111.6 figures were repeated in 2 later publications.

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Organization	Date of Sample	Sample Size Used as Basis for This Report (number of reports or articles)	Average Processing Rate** (indexed articles or reports/ man-day)	Average Cost to Index Each Report or Article ($) As Given	Average Cost to Index Each Report or Article ($) 1968 Value
◭ Pesticides Information Center	1965	--	(17.0-20.5)	--	
♦ Picatinny Arsenal	1956	--	(19.0-40.0)	0.69 0.32	(0.88) (0.41)
⌂ Plastics Technical Evaluation Center	1963-1964	3,370	(23.0)	4.90	(5.49)
⚹	1963	1,000	(23.0)*	20.50*	(23.29)

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Rates and Costs Report

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Comments		Ref.
For a proposed system, bibliographers' time is estimated to be 0. ·0.25 hours per item. To this time must be added the supporting effort of editors, proofreaders, and 0.22 hours per item of typist time. (ref. Sect. B, p. 8). This adds up to a total of at least 0.39-0.47 man-hours per item.		17
The cataloging standard for incoming reports to this library says 0.429 hours/unit "includes time necessary to: obtain reports; remove attached forms; check distribution; fill out form X or Y; cataloging; typing bulletin of reports and secret reports, and file cards for reports Also included are allowances for personal time." Standards given for Uniterming internal reports were 0.201 hrs/unit. This results in rates of 19.0 and 40.0 for external and internals reports, respectively.		68
"Reports are given to the indexer who reviews the terms necessary to insure recall of the document. To date, this has averaged 4 or 5 terms per document." Terms are keypunched, posted to a computer file, and used to print indexes to the file. "Indexing rate averages 2-7/8 documents per hour." $4.90 for the indexing process, $8.20 for the abstracting process, $15.00 for all input processing and index production.		8
"Briefly, this index covers about 1,000 documents, each document being indexed under about 15 terms ... No master vocabulary was used, but an attempt was made to be consistent in assigning index terms. Terms were alphabetized, arranged, and printed by machine ... Abstracts are bound in separate volumes. The costs of abstracting and assigning coordinate terms ($12,680), machine indexing ($5,350), and reproduction ($2,300) worked out to $20.50 per document, which was believed to be exceptionally low." (ref. p. 192). " ... our indexing rate averaged 2-7/8 documents per hour." (ref. p. 195).		4

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Organization	Date of Sample	Sample Size Used as Basis for This Report (number of reports or articles)	Average Processing Rate** (indexed articles or reports/man-day)	Average Cost to Index Each Report or Article ($) As Given	Average Cost to Index Each Report or Article ($) 1968 Value
Science Information Exchange	FY1965	100,000/yr.	--	12.18	(13.43)
	FY1965			12.08	(13.32)
	FY1966			10.45	(11.19)
	1966			11.33-24.24	(12.13-25.96)
Thompson Ramo Wooldridge Inc.	1962	--	--	1.00	(1.15)
U.S. Army Natick Laboratories	1967	1,000	(20-30)	--	

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Rates and Costs Reporte

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Comments	Ref.
SIE indexes project descriptions for input to a computer file For a 3-month period, an average unit cost of $11.33 was reported to input a project into their file. This includes such things as registration, administrative coding, reproduction, indexing, science analysis and coding, keypunching, computer processing, overhead. An additional average unit cost of $12.91 was also reported for this same time period for index maintenance. This same report cites the following input unit costs: FY1965, 1st half $12.18 FY1965, 2nd half 12.08 FY1966, 1st quarter 10.45 As with the above data, this did not include the index maintenance cost. A more general article on SIE, reporting 1967 experiences states that, "To register, analyze, index, and store project records costs about $10 each."	23, 24
Estimate of costs of automatic indexing computer program, exclusive of costs of preparing the machine file of text, and costs of subsequent editing work. "... we arrive at a cost of something like one dollar per article for automatic indexing."	69
A total of 37.58 man-min. per document were required to index and prepare an article for entry into a computer file for an SDI system. Of this time, 17.4 man-min. were required to perform subject indexing. (ref. p. 59). "One trained subject indexer can index approximately 30 documents per day if the subject terms are dictated into a recording machine. If the indexer is required to write out the terms on an indexing worksheet, the task can be accomplished at the rate of 20 documents per day." (ref. p. 57).	73

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Organization	Date of Sample	Sample Size Used as Basis for This Report (number of reports or articles)	Average Processing Rate** (indexed articles or reports/ man-day)	Average Cost to Index Each Report or Article ($) As Given	Average Cost to Index Each Report or Article ($) 1968 Value
Western Reserve University	1959	19,975	8*	--	
	1960	>33,000	--	6.50*	(7.65)
	1961	36,000 est.	--	6.49*	(7.55)
	1962	4,000	--	6.50-7.50*	(7.48-8.63)
Wyeth Laboratories	1964	2,500 est.	(10*)	(3.55)*	(3.98)

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Rates and Costs Reporte

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Comments	Ref.
"After the normal period of training and practice, a metallurgical article may be analyzed in the above four ways (1. traditional annotations and abstracts for publication in Rev. Metal Lit.; 2. telegraphic abstracts; 3. standard subject index entries for use in the indexes of the bound annual volumes of Rev. Metal Lit.; 4. codes based on the ASM-SLA classification) at an average rate of one article per hour. The telegraphic abstract is produced in this way at an incremental cost of approximately $1.25 (above the cost of analysis required for Rev. Metal Lit.)"	35
Total project input costs for a 13-month period were $239,345. The total per unit cost experienced to prepare both a conventional and telegraphic abstract was $6.50. This includes acquisitions, abstracting, editing and quality control, liaison activities, code making, automatic encoding, machine processing, supervision, equipment, supplies, subscriptions, 4% fringe benefits, and 15% overhead. The costs are reported in detail for all of the subprocesses.	55
Summary unit input cost is $6.492 for more than a year of additional experience since the last cost report. This cost includes acquisitions, analysis, editing and quality control, liaison, code making, automatic encoding, supervision, computer processing, supplies, subscriptions, 5% fringe benefits, 20% overhead rate. The costs are reported in detail for all the subprocesses.	54
Estimates of costs of projected system with input volume of 5-20 thousand documents, including all personnel (except the systems manager), equipment, employee benefits, and overhead. This estimate was based on prior WRU operation of a pilot system with 4,000 documents.	57
"Writing and indexing abstracts required one man-year. On a salary basis this is $7,000, however benefits and other overhead charges can be estimated at another $1,000 ... Machine costs are $720 per year. Card costs ... are $57.60. Other paper supplies, filing cabinets, space rental amount to another $100."	19

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Organization	Date of Sample	Sample Size Used as Basis for This Report (number of reports or articles)	Average Processing Rate** (indexed articles or reports/man-day)	Average Cost to Index Each Report or Article ($)	
				As Given	1968 Value
⊗ (64 indexers and 24 of their supervisors from 22 different organizations)	1965	--	27	--	
⊗ (unspecified average for Germany)	1958	--	--	(0.23-2.33)*	(0.28-2.81)
⊠ (unspecified hypothetical abstract bulletin)	1965	10,000	--	0.84	(0.93)

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Rates and Costs Reporte

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Comments	Ref.
Interviews were made with indexers and their supervisors to obtain specific information on the nature of their indexing process and the decision-making procedure. "The mean number of documents indexed daily for all of the indexers was found to be 27.0. The range was from 5 to 100 documents indexed daily." (ref. p. 4-67)	52
"The following costs, which were obtained through thorough and reliable studies and comparisons, may be considered average for Germany: Preparation of a bibliographic card with title and bibliographic sources of a publication — 1.00 DM ($0.23) Preparation of the same bibliographic card with added subject index — 3.00 DM ($0.70) Preparation of a bibliographic card containing an abstract or whatever facts are needed for mechanical selection — 10.00 DM ($2.33) Cost of classifying a title in decimal classification or in another system — 1.00 DM ($0.23) 4.3 DM = 1 dollar."	22
Subscriptions, abstracting, editing, supervising, typing, clerical, and overhead costs are omitted.	25

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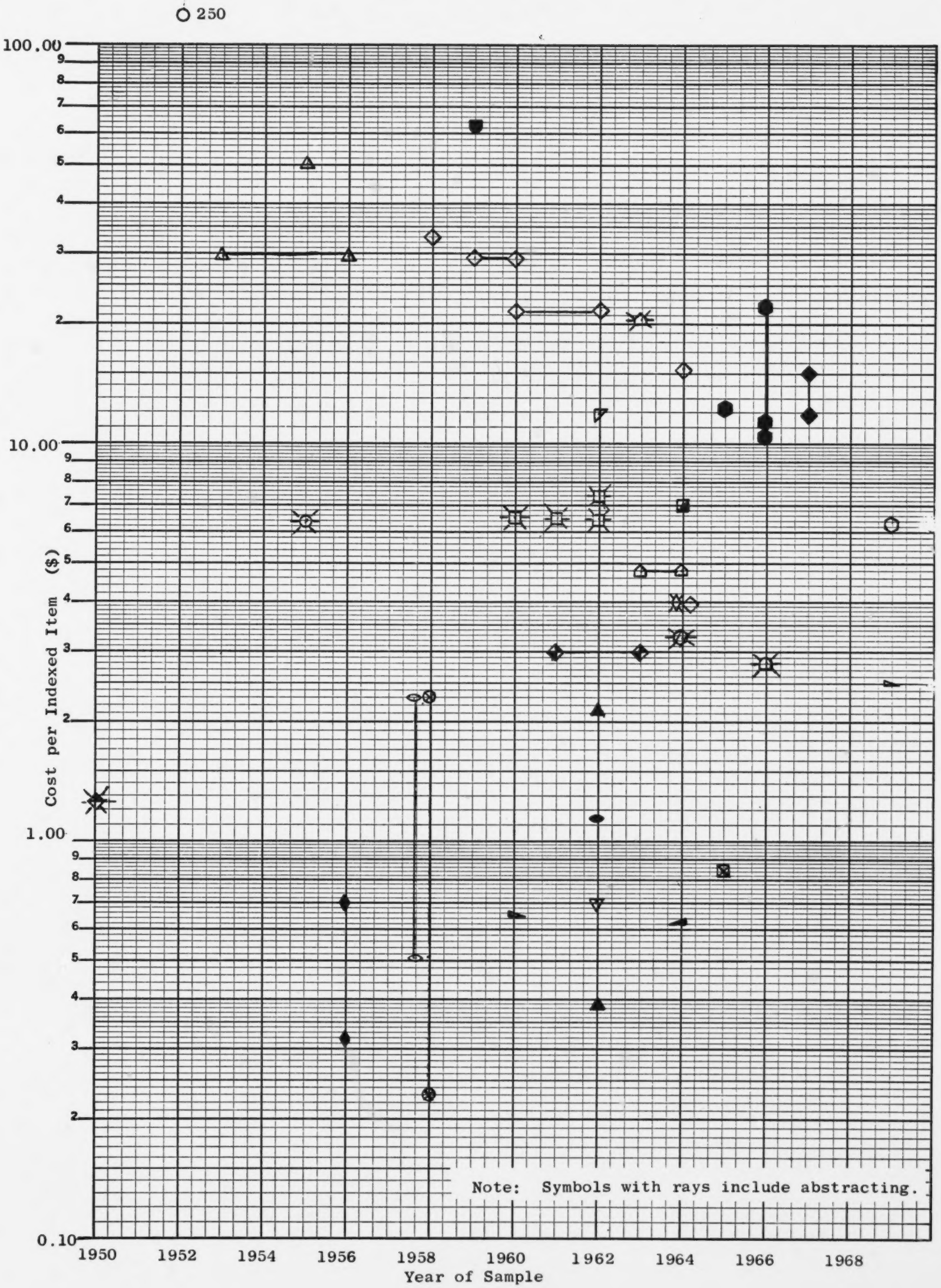

Fig. III-1

Costs of the Indexing Process
(As Given, as a Function
of the Year)

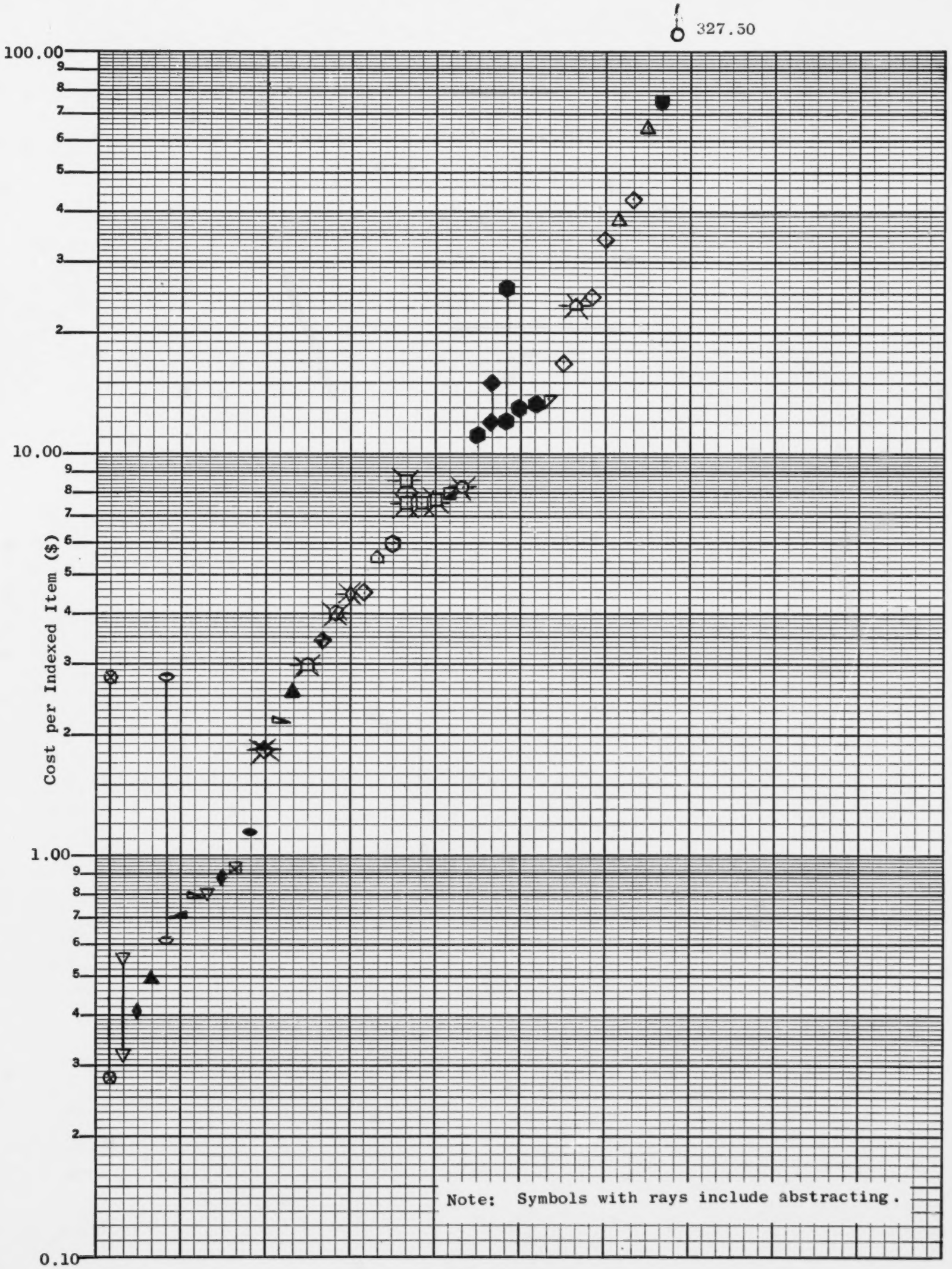

Fig. III-2

Costs of the Indexing Process
(In Rank Order, Adjusted to
1968 Dollar Values)

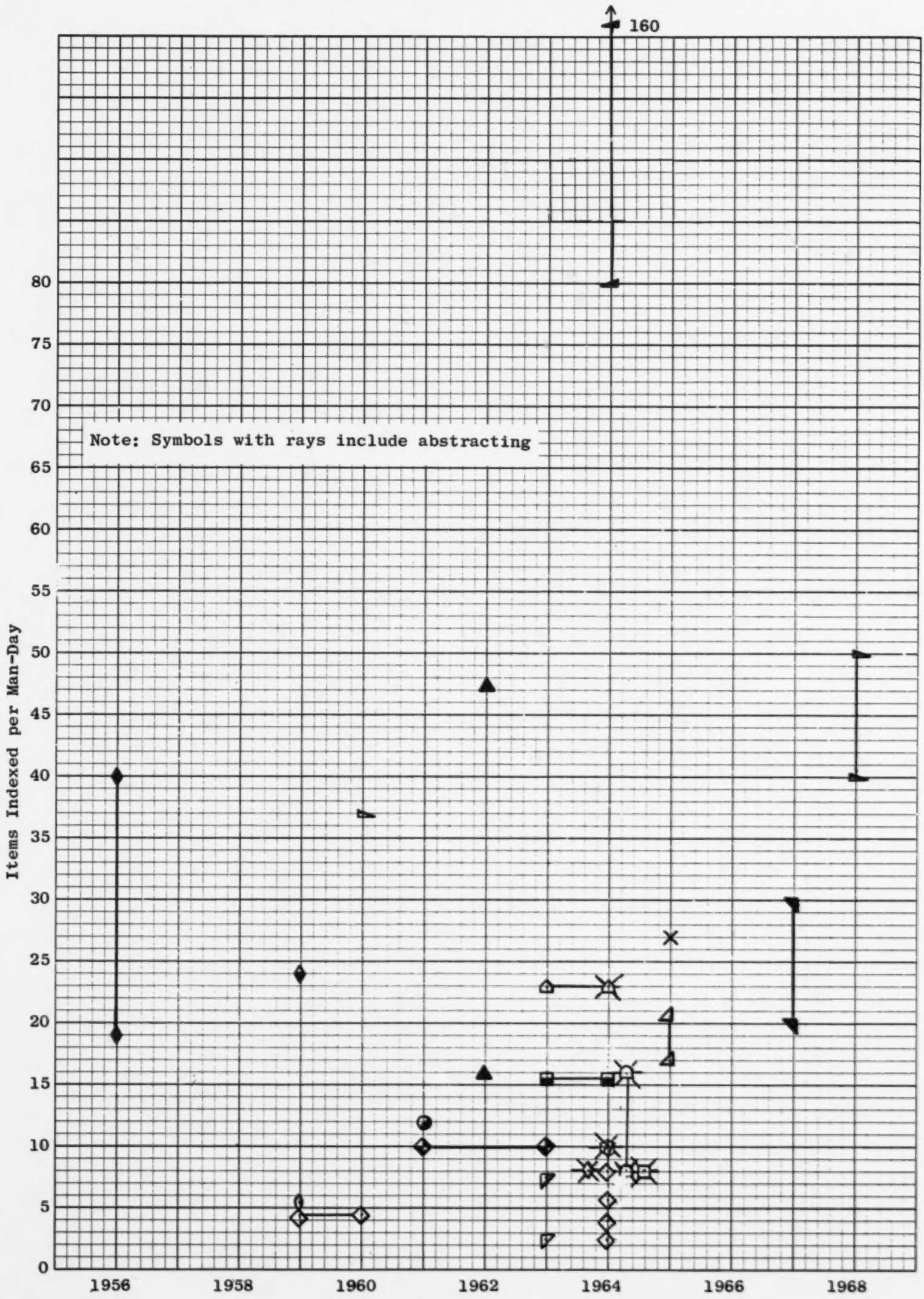

Fig. III-3

Indexing Rates
(As a Function of the Year)

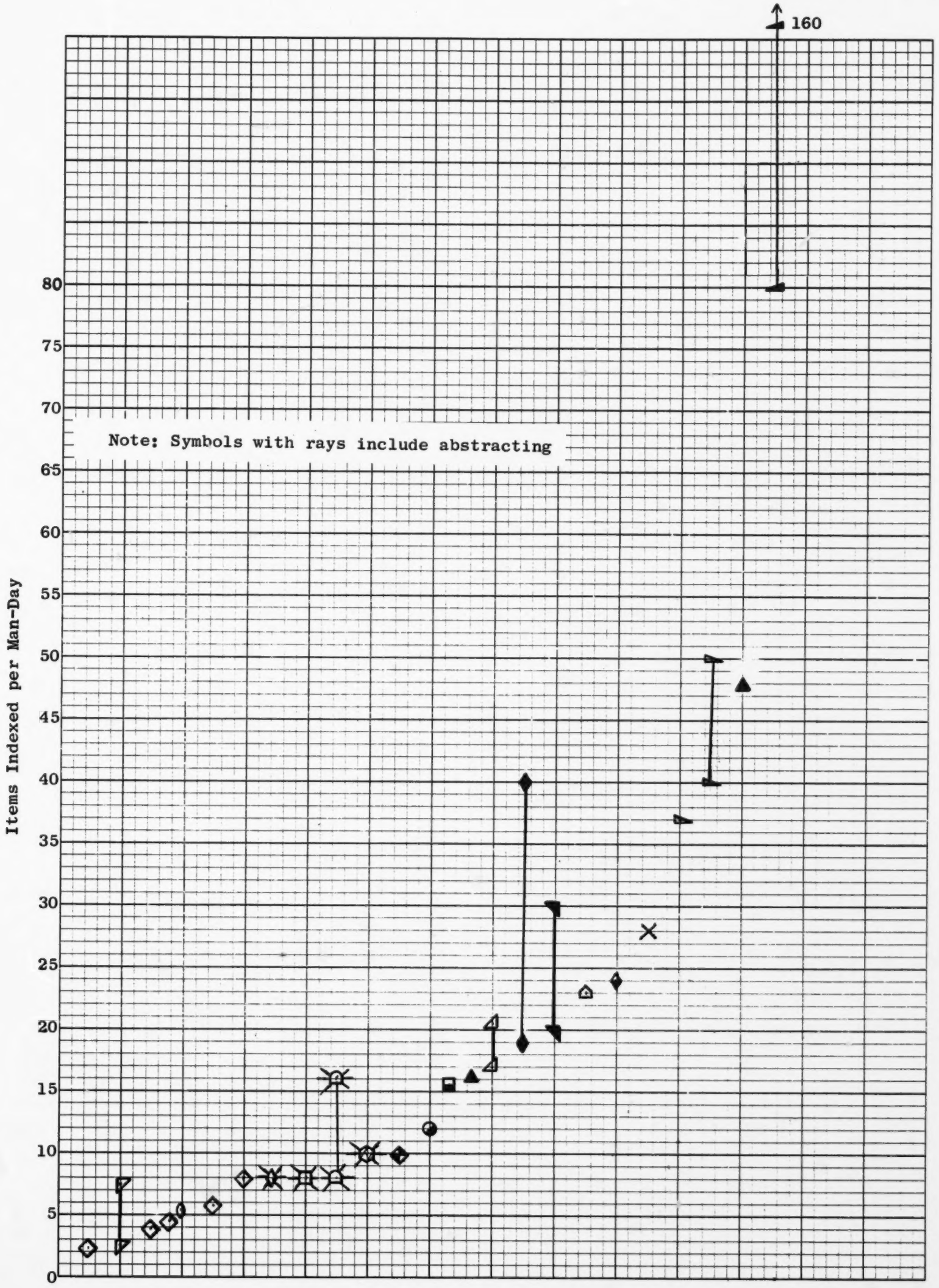

Fig. III-4

Indexing Rates
(In Rank Order)

REFERENCES

1. Abdian, A. G. Defense Documentation Center. Private communication, February 4, 1970.

2. American Mathematical Society. "Report of the Treasurer," May 31, 1964. American Mathematical Society, Bulletin. v.71, no.1, March 1965, p.339-341.

3. American Mathematical Society. "Report on the Affairs of the Society," American Mathematical Society, Notices, v.10, no.6, Oct. 1963, p.548-549.

4. Anzalone, Alfred M., Carol A. Brokars, and Gunther Cohn. "A Novel Index Tailored to Plastics Specialists." American Documentation, v.15, no.3, July 1964, p.191-195.

5. Association for Computing Machinery. "Financial Statements of the ACM." Communications of the ACM, v.11, no.2, Feb. 1968, p.136-137.

6. Association for Computing Machinery. "Financial Statements of the ACM." Communications of the ACM, v.12, no.5, May 1969, p.295-296.

6a. Bachrach, C. A. National Library of Medicine. Private communication, March 5, 1970.

7. Black, J. D. "The Keyword; Its Use in Abstracting, Indexing and Retrieving Information." Aslib Proceedings, v.14, no.10, Oct. 1962, p.313-321.

8. Booz, Allen Applied Research Inc. Mechanization Study of the Plastics Technical Evaluation Center, U.S. Army, Picatinny Arsenal, Dover, N.J.. BARINC rpt. 914-1-12, Sept. 1966. AD 640 107. 35p.

9. Bryant, E. C. Analysis of an Indexing and Retrieval Experiment for the Organometallic File of the U.S. Patent Office. Prepared by Westat Research Analysts, Inc. Aug. 1963 for the U.S. Patent Office. Report WRA PO 10, Aug. 1963.

10. Carlson, Walter M. "Structure and Economics." In Second National Symposium on Engineering Information. Engineers Joint Council, 1965, p.43-47.

11. Carss, Brian W. "The Development and Operation of an Education Resources Information Clearinghouse -- (ERIC)." In Proceedings of the 1968 Clinic on Library Applications of Data Processing. University of Illinois, Graduate School of Library Science, 1969. p.39-53.

12. Carter, Launor F. and others. National Document Handling Systems for Science and Technology. Wiley, 1967. p. 307-308.

13. Chemical and Engineering News, v.42, no.16, April 20, 1964, p.97.

14. Chemical and Engineering News, v.42, no.22, June 1964, p.81.

15. Cleverdon, D. W. "The Evaluation of Systems Used in Information Retrieval." In Proceedings of the International Conference on Scientific Information, National Academy of Sciences, 1959. Vol. 1, p.687-698.

16. Conrad, G. Miles, "The Present Status of Biological Abstracts." Biological Abstracts, v.30, June 1956, p.2129-2134.

16a. Coyne, J. G. Clearinghouse for Federal Scientific and Technical Information. Private Communication. March 3, 1970.

17. Datatrol Corporation. Final Report on Phase 1, Systems Design and Action Plan, for the Pesticides Information Center, National Agricultural Library. Nov. 3, 1965.

18. Dougherty, R. M. "The Scope and Operating Efficiency of Information Centers as Illustrated by the Chemical Biological Information Center of the National Research Council." College and Research Libraries, v. 25, no.1, Jan. 1964, p.7-12.

19. Elias, A. W. "SCAN -- A Flexible Scientific Literature System." In ADI Proceedings, v.1, Parameters of Information Science, 1964, p.121-129.

20. "Engineering Index, Inc. Operating Statements 1961-1965." Prepared by Tripartite Committee, June 1966.

21. Federal Council for Science and Technology. Proceedings of the Second Symposium on Technical Information and the Federal Laboratory. April 13-14, 1964. p.41-45.

22. Frank, Otto. "Cooperation and Coordination in Abstracting and Documentation." In Proceedings of the International Conference on Scientific Information, National Academy of Science, 1959. Vol.1, p.497-510.

23. Freeman, Monroe E. "Determining Costs of Information Systems." Journal of Chemical Documentation, v.7, no.2, May 1967, p.101-106.

24. Freeman, Monroe E. "The Science Information Exchange as a Source of Information." Special Libraries, v.59, no.2, Feb. 1968, p.86-90.

25. Friedenstein, Hanna. "Alerting with Internal Abstract Bulletins." Journal of Chemical Documentation, v.5, no.3, Aug. 1965, p.154-157.

26. Generaux, Raymond P. "The A.I.Ch.E. System for Information Retrieval." In Proceedings of the Engineering Information Symposium. Engineers Joint Council, New York City, Jan. 17, 1962. p.38-41.

27. Gerard, Gary. Kaiser Aluminum and Chemical. Private communication, Jan. 20, 1970.

28. Gerrard, S. A. and D. F. Lyle. "Handling Industrial (Scientific and Technical) Confidential Report Material." Aslib Proceedings, v.18, no.8, Aug. 1966, p.206-217.

29. Hanson, C. W. "Costing Information Services." Aslib Proceedings, v.3, no.2, May 1951, p.85-90.

30. Herner, Saul, F. W. Lancaster, Walter F. Johanningsmeier. "A Case Study in the Application of Cranfield System Evaluation Techniques." Journal of Chemical Documentation, v.5, no.1, Jan. 1965, p.92-95.

31. Hyslop, Marjorie R. "Abstracting Cost Studies." Sci-Tech News, v.13, no.1, Spring 1959, p.5-6.

32. Hyslop, Marjorie R. American Society for Metals. Private communication, Jan. 21, 1970.

33. Keenan, Stella. "Abstracting and Indexing Services in Science and Technology." In Annual Review of Information Science and Technology, v.4, 1969. Encyclopaedia Britannica, 1969, p.273-303.

34. Keenan, Stella. "Abstracting and Indexing Services in the Physical Sciences." Library Trends, v.16, no.3, Jan. 1968, p.329-336.

35. Kent, Allen. "Exploitation of Recorded Information.I. Development of an Operational Machine Searching Service for the Literature of Metallurgy and Allied Subjects." American Documentation, v.11, no.2, April 1960, p.173-188.

36. King, Donald W. "Designs of Experiments in Information Retrieval." Proceedings of the Social Statistics Section of the American Statistical Association, 1963, p.103-118.

37. King, Donald W. "Evaluation of Coordinate Index Systems During File Development." Journal of Chemical Documentation, v.5, no.1, Jan. 1965, p.96-99.

38. Lancaster, F. W. "MEDLARS: Report on the Evaluation of Its Operating Efficiency." American Documentation, v.20, no.2, April 1969, p.119-142.

39. Lancaster, F. W. "Some Observations on the Performance of EJC Role Indicators in a Mechanized Retrieval System." Special Libraries, v.55, no.10, Dec. 1964, p.696-701.

40. Landau, Herbert B. "The Cost Analysis of Document Surrogation: A Literature Review." American Documentation, v.20, no.4, Oct. 1969, p.302-310.

41. Linder, L. H. "Indexing Costs for 10,000 Documents." In Automation and Scientific Communication, Short Papers, Part 2. American Documentation Institute, 1963, p.147-148.

42. Lipetz, Ben-Ami. Documentation Abstracts. Private communication, Jan. 1970.

43. Logue, Paul. "Deep Indexing Technical Reports." Journal of Chemical Documentation, v.2, no.4, 1962, p.215-219.

44. Marin, Carmen M. Tobacco Abstracts. Private communication, Jan. 21, 1970.

45. Maurice, Jewell, Helen E. Loftus and Irene M. Strieby. "Company-Wide Library Service." Special Libraries, v.45, no.2, Feb. 1954, p.53-57.

46. Mohlman, J. W. "Costs of an Abstracting Program." Journal of Chemical Documentation, v.1, no.2, July 1961, p.64-67.

47. Montague, Barbara A. "Testing, Comparison, and Evaluation of Recall, Relevance, and Cost of Coordinate Indexing with Links and Roles." American Documentation, v.16, no.3, July 1965, p.201-208.

48. National Agricultural Library. Agricultural Biological Literature Exploitation; Report of Task Force ABLE; a Systems Study of the National Agricultural Library and Its Users. March 1965, and revisions June 1965. p.414.

49. National Federation of Science Abstracting and Indexing Services. Member Service Descriptions. The Federation, Technical report no.1, Oct. 1969.

50. "National Library of Medicine Index Mechanization Project." Bulletin of the Medical Library Association, v.49, no.1, pt.2, Jan. 1961, p.72-79.

51. News from Science Abstracting and Indexing Services, v.11, no.3, June 1969, p.3.

52. Oliver, Lawrence H., and others. An Investigation of the Basic Processes Involved in the Manual Indexing of Scientific Documents. General Electric Company, Feb. 11, 1966.

53. Orr, Richard H., Vern M. Pings, and Alice A. Leeds. "Reference Retrieval Tools: Biomedical Abstracting and Indexing Services." Federation Proceedings, v.23, pt.1, 1964, p.1164-1176.

54. Overmyer, LaVahn. "The Dollars and Cents of Basic Operations in Information Retrieval." In Information Retrieval in Action, Western Reserve University, 1963. p.199-211.

55. Overmyer, LaVahn. "Test Program for Evaluating Procedures for the Exploitation of Literature of Interest to Metallurgists." American Documentation, v.13, no.2, April 1962. p.210-222.

56. Parkins, Phyllis V. "BioSciences Information Service of Biological Abstracts." Science, v.152, no.3724, May 13, 1966, p.889-894.

57. Reeves, Pamela, and others. The Library of Tomorrow -- Today. Center for Documentation and Communication Research, Western Reserve University, 1962. Chapt. 6.

58. Rigby, Malcolm and Marian K. Rigby. "Cost Analysis of Bibliographies or Bibliographic Services." In Proceedings of the International Conference on Scientific Information. National Academy of Sciences, 1959. Vol.1, p.381-392.

59. Rowlett, Russell J. Chemical Abstracts Service. Private communication, Feb. 17, 1970.

60. Russell, Martin and Robert R. Freeman. Computer-Aided Indexing of a Scientific Abstracts Journal by the UDC with UNIDEK; a Case Study. American Institute of Physics, rpt. AIP/UDC-4, April 1, 1967. 26p.

61. Schmidt, C. J., R. P. Wesley, and C. H. Hunter. "KAPL's Automated Information Retrieval System." In ADI Proceedings, v.1, Parameters of Information Science, 1964, p.177-184.

62. Schutze, Gertrude. Documentation Sourcebook. Scarecrow, 1965.

63. "Science Information Services in the United States." Biological Abstracts, v.36, no.14, July 15, 1961, p.xii.

64. Sewell, Winifred. "Problems of Issuing a Company Pharmaceutical Abstract Bulletin." Special Libraries, v.45, no.2, Feb. 1954, p.63-66.

65. Snyder, Richard L. Documentation Abstracts. Private communication, Jan. 1970.

66. Speight, Frank Y. and Norman E. Cottrell. The EJC Engineering Information Program -- 1966-67. Engineers Joint Council, Feb. 1967. 45p.

67. Stevens, M. E. Automatic Indexing: A State-of-the-Art Report. U.S. National Bureau of Standards, Monograph 91, 1965. 220p.

68. Stevens, Norman D. A Comparative Study of Three Systems of Information Retrieval. Rutgers University Press, 1960.

69. Swanson, Don R. "Library Goals and the Role of Automation." Special Libraries, v.53, no.9, Oct. 1962, p.466-471.

70. System Development Corporation. Recommendations for National Document Handling Systems in Science and Technology. Appendix A - Background Study, Vol. II, 1965. PB 168 267. AD 624 560.

71. System Development Corporation. A System Study of Abstracting and Indexing in the United States. Dec. 16, 1966. PB 174 249.

72. Taylor, L. "Cost Research on a Library Service." Aslib Proceedings, v.13, Sept. 1961, p.238-248.

73. U.S. Army Laboratories. Selective Dissemination of Information, Volume 1: Pilot Test at U.S. Army Natick Laboratories. ATLIS rpt.15, May 1956. AD 654 997.

74. U.S. Navy. Bureau of Ships. Project SHARP Information Storage and Retrieval System: Evaluation of Indexing Procedures and Retrieval Effectiveness. NAVSHIPS 250-210-3, June 1964, 49p.

75. Van Gulick, Robert R. Biosciences Information Service. Private communication, Jan. 28, 1970.

76. Vig, Norman J. A Report on the Classification Operation in the U.S. Patent Office. Unpublished report, Office of Research and Development, Sept. 14, 1962. Cited by Edward C. Bryant, A Progress Report on Search System Evaluation in the United States Patent Office. Westat Research Analysts, Inc. WRA PO 14, May 1964.

77. Wetsel, F. R. "Time Studies in Producing Subject Indexes for Chemical Abstracts." Journal of Chemical Documentation, v.5, no.4, Nov. 1965, p.212-214.

78. Whaley, Fred R. "Operational Experience with Linde's Indexing and Retrieval System." In Information Retrieval Systems Conference, IBM, Sept. 21-23, 1959. IBM, E20-8040.

79. Woods, Bill M. Engineering Index, Inc. Private communication, Feb. 17 and April 9, 1970.